

WHAT IS CLAIMED IS:

1. A zoom system for forming an image with varying magnification comprising one or more variable focal length lenses.
- 5 2. The zoom system of claim 1, wherein the variable focal length lens is made of a micromirror array lens, wherein the micromirror array lens comprises a plurality of micromirrors.
- 10 3. The zoom system of claim 2, and wherein each micromirror is controlled to change the focal length of the micromirror array lens.
- 15 4. The zoom system of claim 2, wherein the translation of each micromirror of the micromirror array lens is controlled.
- 20 5. The zoom system of claim 2, wherein the rotation of each micromirror of the micromirror array lens is controlled.
6. The zoom system of claim 2, wherein the translation and rotation of each micromirror of the micromirror

array lens are controlled.

7. The zoom system of claim 2, wherein the micromirrors
of the micromirror array lens are arranged to form one
5 or more concentric circles.

8. The zoom system of claim 2, wherein each micromirror
of the micromirror array lens has a fan shape.

10 9. The zoom system of claim 2, wherein the reflective
surface of each micromirror of the micromirror array
lens is substantially flat.

10. The zoom system of claim 2, wherein the reflective
15 surface of each micromirror of the micromirror array
lens has a curvature.

11. The zoom system of claim 10, wherein the curvature is
controlled.

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12. The zoom system of claim 2, wherein each micromirror
of the micromirror array lens is actuated by
electrostatic force.

13. The zoom system of claim 2, wherein each micromirror of the micromirror array lens is actuated by electromagnetic force

5 14. The zoom system of claim 2, wherein each micromirror of the micromirror array lens is actuated by electrostatic force and electromagnetic force.

10 15. The zoom system of claim 2, wherein the micromirror array lens further comprises a plurality of mechanical structures upholding the micromirrors and actuating components actuating the micromirrors, wherein the mechanical structure and the actuating components are located under the micromirrors.

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16. The zoom system of claim 2, wherein the micromirror array lens is a reflective Fresnel lens.

20 17. The zoom system of claim 2, wherein the micromirrors are arranged in a flat plane.

18. The zoom system of claim 2, and wherein each micromirror is controlled to change the focal length of the micromirror array lens.

19. The zoom system of claim 2, wherein the micromirror
array lens is an adaptive optical component, wherein
the micromirror array lens compensates for phase
5 errors of light introduced by the medium between an
object and its image.

20. The zoom system of claim 2, wherein the micromirror
array lens is an adaptive optical component, wherein
10 the micromirror array lens corrects aberrations.

21. The zoom system of claim 2, wherein the micromirror
array lens is an adaptive optical component, wherein
the micromirror array lens corrects the defects of the
15 zoom system that cause the image to deviate from the
rules of paraxial imagery.

22. The zoom system of claim 2, wherein the micromirror
array lens is an adaptive optical component, wherein
20 an object which does not lie on the optical axis can
be imaged by the micromirror array lens without
macroscopic mechanical movement of zoom system.

23. The zoom system of claim 2, wherein the micromirror

array lens is controlled to satisfy the same phase condition for each wavelength of Red, Green, and Blue (RGB), respectively, to get a color image.

5 24. The zoom system of claim 23, further comprising a plurality of bandpass filters.

25. The zoom system of claim 23, further comprising a photoelectric sensor, wherein the photoelectric sensor
10 comprises Red, Green, and Blue (RGB) sensors, wherein a color image is obtained by treatment of electrical signals from the Red, Green, and Blue (RGB) sensors.

26. The zoom system of claim 25, wherein the treatment of
15 electrical signals from the Red, Green and Blue (RGB) sensors is synchronized and/or matched with the control of the micromirror array lens to satisfy the same phase condition for each wavelength of Red, Green and Blue (RGB), respectively.

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27. The zoom system of claim 1, wherein the variable focal length lenses comprise a first variable focal length lens and a second variable focal length lens, wherein the focal length of the first variable focal length

lens and the focal length of the second variable focal length lens are changed to form the image in-focus at a given magnification.

- 5 28. The zoom system of claim 27, wherein the first variable focal length lens is made of a micromirror array lens, wherein the micromirror array lens comprises a plurality of micromirrors.
- 10 29. The zoom system of claim 27, wherein the second variable focal length lens is made of a micromirror array lens, wherein the micromirror array lens comprises a plurality of micromirrors.
- 15 30. The zoom system of claim 27, wherein the first variable focal length lens and the second variable focal length lens are made of micromirror array lenses, wherein each of the micromirror array lenses comprises a plurality of micromirrors.
- 20 31. The zoom system of claim 27, further comprising a beam splitter positioned between the first variable focal length lens and the second variable focal length lens.

32. The zoom system of claim 27, wherein the first
variable focal length lens and the second variable
focal length lens are positioned so that the path of
the light reflected by the first variable focal length
5 lens and the second variable focal length lens is not
blocked.

33. The zoom system of claim 27, further comprising a
focus lens group, an elector lens group and a relay
10 lens group, wherein the first variable focal length
lens forms a variator lens group, and the second
variable focal length lens forms a compensator lens
group.